REMARKS

The Applicants have carefully considered the detailed Office Action and set forth detailed responses herein. Reconsideration of the above application is respectfully requested.

Claim Amendments and New Claims

The Applicants express appreciation to the Examiner and Examiner Pyon for the courteous and helpful telephone interview on August 7, 2003 in regard to this application.

The Applicants have made amendments to the claims as appropriate. The Applicants have amended the claims to separate claims for natural leather and for reconstituted natural leather. These amended claims also define clearly that this is a natural product with which the invention is concerned.

During the interview the reference of Parker was discussed and the appropriateness of the submission of method and composition claims at this stage was also discussed.

Since the allowability issue of 'method of use' claims have not yet been fully resolved, these news claims are withdrawn without prejudice at this time. In anticipation of there subsequent allowablility they are also amended to language which is believed will be conforming with allowable claims for the 'method of use' claims. It is understood that these withdrawn claims can be resubmitted and rejoined when appropriate 'method of use' claims have been allowed.

Accordingly, submitted new claims 37 to 55 previously added have been withdrawn (in addition to being amended) without prejudice pending resolution of allowability of other claims. Claims 37 to 50 are set out as method claims and claims 51 to 55 are composition claims.

Synopsis of the Invention

This invention relates to treating natural leather and reconstructed (regenerated) natural leather by coating it with polyethylene. The present invention thus relates to reconstructed natural leather material or natural leather product. These are both natural products derived from animal hide.

Contrarily, artificial leather, also called synthetic leather, leatherette, or leatheroid, is a non-natural product. Artificial leather is made of synthetic materials, such as a polymer, fabric, or nonwoven material.

The Applicants have found that the application of a polyethylene coating to a reconstructed natural leather sheet greatly improves the properties and the appearance of reconstructed natural leather product.

It is well known to those skilled in the art that the properties and appearance of reconstructed natural leather are not as good as natural leather, although it is much cheaper than the natural product. Tests have shown that if the polyethylene coating is provided with a leather scent, it is almost impossible to distinguish the reconstructed natural leather with the polyethylene coating from a natural leather sheet without a coating.

Synthetic leather products, which are very different, have been formed in practice with polyvinyl chloride and polyurethane, but not in the Applicant's experience with polyethylene. This is a very different substrate. Just because it is called synthetic "leather", does not make it natural leather. It is always well recognized that a synthetic product is very different in many respects from a natural product.

Accordingly, the advance of using polyethylene to enhance the natural-based leather product is significant.

Legal Standards

The Applicants believe that it is appropriate under the circumstances and status of this application to be reminded of the legal standards for determining patentability in the case of an invention in the manner now claimed.

The MPEP states in relevant part:

2143 Basic Requirements of a *Prima Facie* Case of Obviousness

To establish a *prima facie* case of obviousness, **three** basic criteria must be met. First, **there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art,** to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success.

Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (emphasis added).

The **teaching or suggestion** to make the claimed combination and the reasonable expectation of success must both be found in the prior art, **not in applicant's disclosure**. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (emphasis added).

1. 2143.01 Suggestion or Motivation To Modify the References

a. THE PRIOR ART MUST SUGGEST THE DESIRABILITY OF THE CLAIMED INVENTION

"There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper). **The level of skill in the art cannot be relied upon to provide the suggestion to combine references**. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999). (emphasis added).

"In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification." *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is **some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art**. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000).

See also *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Further Authorities on the Appropriate Legal Standards are:

Combination of References

Winner International Royalty Corp. v. Wang, 202 F.3d 1340, 1348, 53 USPQ2d 1580, 1586 (Fed. Cir. 2000) ("The dispute here focuses on the combinability of the prior art. When an obviousness determination is based on multiple prior art references, there must be a showing of some 'teaching, suggestion, or reason' to combine the references").

Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed. Cir. 1997) (also noting that the 'absence of such a suggestion to combine is dispositive in an obviousness determination').

Prima facie Obviousness Standard

In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) ("To establish a *prima facie* case of obviousness based on a combination of the content of various references, there must be some teaching, suggestion or motivation **in the prior art** to make the specific combination that was made by the applicant."). (emphasis added).

Riverwood International Corp. v. Mead Corp., 212 F.3d 1365, 1366, 54 USPQ2d 1763, 1765 (Fed. Cir. 2000), *cert. denied*, 121 S. Ct. 567 (2000) ("when obviousness is based on particular prior art references, there must be a showing of a suggestion or motivation to combine the teachings of those references, though it need not be expressly stated.").

Hindsight

In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."). Also see *Ecolochem, Inc. v. Southern California Edison Co.*, 227 F.3d 1361, 1371, 56 USPQ2d 1065, 1073 (Fed. Cir. 2000).

Ruiz v. A.B. Chance Co., 234 F.3d 654, 664, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000) ("In order to prevent a hindsight-based obviousness analysis, we have clearly established that the relevant inquiry for determining the scope and content of the prior art is whether there is a reason, suggestion, or motivation **in the prior art or elsewhere** that would have led one of ordinary skill in the art to combine the references."). (emphasis added).

The MPEP states in relevant part:

1. 716.03 Commercial Success

   a. NEXUS BETWEEN CLAIMED INVENTION AND EVIDENCE OF COMMERCIAL SUCCESS REQUIRED

An applicant who is asserting commercial success to support its contention of non-obviousness bears the burden of proof of establishing a nexus between the claimed invention and evidence of commercial success.

The Federal Circuit has acknowledged that the applicant bears the burden of establishing nexus. The PTO must rely upon the applicant to provide hard evidence of commercial success.

b. COMMERCIAL SUCCESS ABROAD IS RELEVANT

Commercial success abroad, as well as in the United States, is relevant in resolving the issue of non-obviousness. *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984).

Rejections

The main rejection on the merits relates to two references, Parker and Irion, and the Examiner has maintained that it is obvious to combine their teachings.

The other references are not discussed in detail in this response, since they are secondary to the issues raised in the references of Parker and Irion.

Parker refers to reconstructed leather. Parker makes clear, as does the present application, as would others skilled in the field know, that this is a natural leather product made of scraps of leather.

Irion refers to synthetic leather. These are very different substrates. Synthetic leather can be coated with polyurethane or polyethylene.

Prior Art Has No Motivation For Combination

Fundamentally, there is no motivation, teaching or suggestion in the prior art for applying polyethylene to reconstructed leather or natural leather, both being natural products.

Parker is an excellent example of how different synthetic leather is form natural reconstituted leather. Parker states that synthetic or artificial leathers are deficient in many respects. Parker sets up absolutely the difference between the deficient synthetic leather product and the natural leather product. They are two totally different kinds of product: natural versus synthetic. (Parker, Column 1 lines 25 to 52).

The leather industry may be one of the oldest in time-from the biblical age. It is practiced world wide extensively for numerous purposes. The Examiner is referred to the attached pages from the Encyclopaedia Britannica dealing with the history of leather and some of the basic treatments undergone by the raw product to make leather commercial products. (Encyclopedia Britannica, Volume 13, Edition 1972, pages 866 to 873). *Exhibit A.* The Encyclopedia also refers to the use of urethane on natural leather. (Encyclopedia Britannica, Volume 13, Edition 1972, page 873). Again there is not the slightest suggestion is made of other plastic coatings on natural leather, in the nature of polyethylene.

Indeed from all the prior art it is clear, as the Applicants have been pointing out to the Examiner repletely, that natural leather is a product class of its own, with unique natural properties. These are natural properties that one would not want to spoil in any subsequent treatment. Reconstituted natural leather is also a natural product.

The Applicants are certain that the Examiner will be persuaded, after further consideration, the that natural leather industry therefore is clearly to be considered a totally different industry to synthetic plastics-whose aim might include the manufacture of a synthetic leather.

Parker explains his own invention that is related to reconstituted leather - a natural product, also distinguishing it clearly from the synthetic product, which he states is inferior.

The Encyclopedia also explains the different class of products termed imitation leather. This is the synthetic product and it is clearly a totally different product to a natural product. (Encyclopedia Britannica, Volume 13, Edition 1972, page 867).

Additional reference material is enclosed which deals with the products. These references are *Exhibits B, C* and *D.* Interestingly, the U.S. regulations under 16 C.F.R. Section 24 clearly sets out the different definitions of the different leather products.

There are latex additives to reconstituted natural leather material, namely scraps of natural leather to form the reconstituted natural leather sheet. Urethane is added to the Parker reconstituted natural leather for the very purposes that the Applicants herein have previously explained to the Examiner - namely to assist against abrasion.

However, there is not the slightest suggestion, motivation, teaching or hint given in Parker, or elsewhere for that matter, of adding a polyethylene film to reconstituted leather material.

The fact that reconstituted leather may have some binder like material to effect the formation of the end product does not make it respectfully any less a natural product. It is essentially a natural product with some binders to hold macerated or mixed scraps of natural leather together, and then like natural leather can be treated with urethane as necessary. Just like the Encyclopedia discloses that teaching for natural leather, so too Parker explains that urethane can be used for reconstituted leather. (Parker, Column 7, lines 11 to 28).

Again nowhere is there the remotest suggestion of using polyethylene film on a natural leather product.

Parker discloses a method for the production of reconstituted leather. In a first step a required amount of polyurethane latex is diluted with water and then the required amount of shredded scrap leather fiber is added stepwise to the latex mixture. At this stage, other materials may also be incorporated in the mixture to improve the properties of the final reconstituted leather sheet, such as unbleached kraft pulp to increase resistance, or a coalescing agent, which aids in the reconstituted leather sheet formation. Once added in the slurry, these added materials cause the polymeric articles to deposit out of the slurry in a more uniform pattern and adhere in an integrated network.

The second step refers to the sheet production, which is performed using conventional paper making equipment and related procedures.

A third optional step comprises the coating with the same polymeric material (polyurethane) or others, depending upon the desired surface characteristics of the sheet being produced.

The use of polyurethane latex coating is the only one clearly reported in the specification. No other references are given for any other kind of coatings. So, Parker clearly teaches away from the subject matter, polyethylene on natural leather or reconstituted leather, in the present application.

Irion describes the process for bonding a polyethylene film to a fibrous web. Irion cannot be considered in view of Parker for rendering unpatentable the subject matter related to the present application.

The Irion process involves the permeation of the backing web by molten polyethylene, which is allowed to cool to approximately room temperature or below while in seemingly intimate contact with the web fibers. However, despite these seemingly optimum conditions, the bond between the polyethylene film and the backing web is weak (column 2, lines 28-34).

Irion only relates to **synthetic** materials, namely the substrate is a polyurethane foam and fibrous web. Irion discloses bonding an embossed polyethylene film to fibrous web. It is a synthetic product. As discussed above, the fibrous web is a substrate clearly different from natural leather in property.

There is a significant inventive advance in the invented method as carried out on natural leather or reconstructed natural leather, which is not synthetic leather. This use is not remotely suggested in Irion, or in Parker. No suggestion at all is given in either reference that the method can be carried out on a natural leather or reconstructed natural leather.

The substrate and the coating materials as claimed in combination are different.

As is well known to those skilled in the art, the properties of natural leather or reconstructed natural leather are clearly different to artificial leather or synthetic leather.

It should be clear that natural leather or reconstructed natural leather, as used in the claims of this patent application, is a natural product, and not an artificial product, such as artificial or synthetic leather.

It is well known that the properties and appearances of reconstructed natural leathers are clearly different from those of artificial or synthetic leathers. Reconstructed natural leathers are composed of natural collagen fibers, which possess significantly different properties from synthetic polymers. Therefore, the coating methods of the polymers are also clearly different due to the difference of their properties. Furthermore, the reconstructed natural leather or natural leather possesses much better high temperature resistance and chemical resistance compared with that of artificial leathers.

Simply stated, there is no disclosure, teaching or suggestion at all that the methods of any of the prior art can be carried out on the natural products of leather or reconstructed narural leather.

There is a significant inventive advance in the present invention. It is, as defined, for natural leather or reconstructed natural leather. Both are natural products, and not synthetic products.

Before The Invention, It Was Counterintuitive To Coat The Natural Leather Product With Polyethylene

The coating principles and methods of the polymers are different. Therefore, inventiveness was needed for polyethylene to be used in the method and composition of the present claims.

It was well known to those skilled in the art that the nice appearance of leather will be spoiled if the polyethylene film is coated. However, unexpectedly and contrary to belief, the excellent appearance of leather could be obtained by the present invention. It is a great advance in the art. Therefore, the claims of the present invention involve inventive step, and it is believed that the claims as now submitted are allowable.

The Examiner can point to no motivation in the prior art to combine the teachings of the prior art to achieve the results of the invention. It is only the present Applicants who took that unexpected and counterintuitive step and produced a superior product as now claimed. And, since it was the Applicant, and not the prior art, that achieved this, and the Examiner cannot show anything to the contrary, the present invention as claimed is allowable.

It is particularly interesting to note that the reference of Irion is a 1952 teaching of synthetic leather treatment. Then, in 1966 there is the Parker reference that dealt with reconstituted leather and its treatment. Both those technologies are entirely different. Thirty years later in 1996, the application for the present invention was filed.

These very long spaces of time between the three different technologies implicitly, and indeed explicitly, show the non-obviousness of the current invention. The field of leather treatment is an old and active one which is subject to extensive technology workings around the world. Yet, despite this, no one before the present inventors were able to conceive of applying the coating from the artificial (synthetic) field of leather to the field of natural leather or reconstituted natural leather in a manner to bring the significant advances to the natural product that have been achieved.

It is the most clear form of hindsight imaginable for the Examiner to progressively look for references based on the invention as claimed, and simply **without any basis in these references** state that it would be obvious to combine the teachings of those references to come up with present invention. In fact, nothing more than the long time gaps, covering about 50 years between the different teachings in the active technological field, could be clearer to show that it occurred to no one, before the present inventors, for the present invention to be created as defined. Indeed, the references leave very large holes in the two different kinds of technology. These holes have been filled for the first time by the present invention.

There has been created for the first time a natural leather product with a polyethylene coating. It is a superior product than previously available. To use reconstructed leather, which is formed of shards and pieces of leather usually inferior to the natural leather sheet appearance, and to apply polyethylene to the leather, and obtain a product equal to natural leather, is a major advance which has been recognized and is clearly patentable.

The Examiner seems to dismiss, without any argument to support the Examiner's position, the statement that persons in the field would normally not apply a coating which would have been thought to spoil the natural product. Persons in that the field simply would not do such things, namely, to apply polyethylene to a natural leather product. The Examiner can provide no evidence to the contrary.

There is no motivation in either one of the references to combine the technology of either reference with the other reference. Respectfully, it is only the Examiner who has allegedly formed a motivation to combine those teachings. This is the trap of hindsight into which the

Examiner has unfortunately fallen. This is not permissible, as is clear from the standards of law which are to be applied, and which are elucidated above.

The Invention Is For A Significantly Enhanced Polyethylene Coated Leather Natural Product

Respectfully, and contrary to the opinion of the Examiner, a skilled person, an expert in leather working, would be forced away from the technical solution of the present application, since it would hide or destroy all the good properties of the leather article itself.

The present invention makes significant progress compared with prior art. It would be counter-intuitive to coat natural leather with a coating such as polyethylene. One would be taking a high quality natural product, and seemingly degrading it.

Yet the application of polyethylene to the natural product -- leather and reconstructed leather -- has brought about a significant advance in the leather industry.

Polyethylene coated reconstituted leather by the invention is now made available as a superior leather product, which previously was not feasible or possible.

Natural leather was previously coated with polyurethane, in some instances, for the purposes of conferring higher water resistance, a soft and smooth sensation to the touch as well as homogeneous appearance. It included the disadvantages of not being resistant to scrapes or scratches and, once deteriorated, the polyurethane surface would appear very rough and irregular.

Polyurethane is a very different coating to polyethylene.

Therefore, here also the invented polyethylene coated leather has advantages of being very resistant to mechanical stress, as well as to water, with the high valuable appearance of the natural leather.

Conclusion

In view of the above, it is submitted that this application is now in good order for allowance, and such early action is respectfully solicited. Should matters remain which the Examiner believes could be resolved in a telephone interview, the Examiner is requested to telephone the Applicant's undersigned attorney.

Respectfully submitted,

Date: August 13, 2003

Charles Berman
Reg. No. 29,249

Customer Number 33717
GREENBERG TRAURIG, LLP
2450 Colorado Avenue, Suite 400E
Santa Monica, CA 90404
Phone: (310) 586-7770
Fax: (310) 586-0271
E-mail: bermanc@gtlaw.com
\\LA-SRV01\195590v01

Exhibit A

PRINTED IN THE U.S.A.

Library of Congress Catalog Card Number: 77-149817
International Standard Book Number: 0-85229-162-0

ENCYCLOPÆDIA BRITANNICA

VOLUME
13

First Published in 1768
by A Society of Gentlemen in Scotland

ENCYCLOPÆDIA BRITANNICA, INC.

William Benton, Publisher

CHICAGO · LONDON · TORONTO · GENEVA · SYDNEY · TOKYO · MANILA

retention may deteriorate as the postlearning activity resembles the learning task. If the material to be retained is of adjectives, subsequent learning of a list of their synonyms interfere with recall of the first list. Practice on a list of bers on the other hand, will leave the retention of a previously ned list of adjectives relatively intact.

nderstanding the Learning Process.—Learning efficiency rreased by a general understanding of the principles of learn-. For example, the learner should know that the rate of im-vement during practice on a complex task is by no means dy. It is very rapid at first; the first few trials often account mastery of a considerable fraction of the total. Each subse-nt trial contributes decreasingly; for example, the difference ween the skilled marksman and a fairly good shot may involve dreds of hours of practice. It is also useful to anticipate the od of no improvement, called a plateau, that often occurs in plex task learning. Plateaus tend to appear in graphs of the of learning when separate response components begin to merge continuous, smooth acts. For example, a plateau is commonly d in learning to send Morse code. When the learner's skill in ing letters reaches a high point, he is able to begin to learn to whole words. The transition is necessary if the skill of the rt is to be acquired, but it involves a period of no increase in d. However, during the plateau the letter-sending habits are g overlearned to that point of near automaticity which frees sender to read ahead and reduce the interval between letters. plateau seems unavoidable, but understanding its nature and tion reduces discouragement and anxiety while it lasts.

rogrammed Learning.—A recent contribution to the tech-gy of education, programmed instruction was suggested by the al, psychological analysis of the learning process. In this hod of teaching, a subject matter is reduced to small parts, ally stated as simple sentences or formulas. Ordered in a se-ntial fashion, these elements are presented one at a time, lack-a crucial word, symbol or number which the learner must sup-correctly before proceeding. The mechanics of the process involve a program printed on a roll of paper presented one at a time by a so-called teaching machine. The learner sup-the missing content directly upon the roll. A pull on a lever advances the paper to move the student's answer behind a parent window and to reveal the answer that was expected; ese match, the student is reinforced. Other forms of presenta-include programmed textbooks, in which the incomplete item ven on one page, with the missing information and the next on the following page. Whatever the method of presentation, retically the learner benefits from the constant check on his ac-cy and understanding, from such small consecutive steps that eldom makes a time-consuming mistake, and from the imme-opportunity to have his correct responses reinforced. Pro-amed devices can be employed at the student's own rate; unlike teachers, they can avoid excessively large steps and never be-bored or impatient. In a sense, the program is like a tutor. ntinually requires the learner to give evidence of his under-ding rather than simply letting him read with uncertain com-ension. *See* PROGRAMMED LEARNING; *see* also references un-"Learning" in the Index.

BIBLIOGRAPHY.—B. R. Bugelski, *Psychology of Learning* (1956); R. Bush and F. Mosteller, *Stochastic Models for Learning* (1955); Dorse, *Psychology of Learning*, 2nd ed. (1958); W. K. Estes, *et al.*, *dern Learning Theory* (1954); C. Ferster and B. F. Skinner, *Sched-s of Reinforcement* (1957); E. R. Guthrie and G. P. Horton, *Cats Puzzle Box* (1946); E. R. Hilgard, *Theories of Learning*, 2nd ed. 6); E. R. Hilgard and D. G. Marquis, *Conditioning and Learning*, ed. by G. A. Kimble (1961); C. L. Hull, *Principles of Behavior* 1); W. Köhler, *Mentality of Apes*, Eng. trans. from 2nd rev. ed. lin Winter (1926); K. S. Lashley, *Brain Mechanisms and Intelli-e* (1929); J. A. McGeoch, *Psychology of Human Learning*, 2nd ed. by A. L. Irion (1958); N. Miller and J. Dollard, *Social Learning Imitation* (1945); O. H. Mowrer, *Learning Theory and Behavior* 0); I. P. Pavlov, *Conditioned Reflexes*, Eng. trans. and ed. by . Anrep (1927); B. F. Skinner, *Behavior of Organisms* (1938), *ce and Human Behavior* (1953); K. W. Spence, *Behavior Theory Learning* (1960); S. S. Stevens (ed.), *Handbook of Experimental chology* (1951); N. Tinbergen, *Study of Instinct* (1952); E. C. man, *Purposive Behavior in Animals and Men* (1932).

(K. MacC.)

LEASE: *see* LANDLORD AND TENANT; LAND TENURE: ECONOMIC AND AGRARIAN ASPECTS.

LEAST SQUARES, METHOD OF. The method of least squares is a mathematical tool based on the idea that the value which best represents (or fits) a given set of quantities is one which minimizes the sum of the squared differences between itself and these quantities. For example, according to the least squares principle, the arithmetic mean of a set of repeated experimental measurements subject to random error is the value which best represents the set (*see* MEAN).

Thus, if $m_1, m_2, \ldots, m_n$ are measured values of an unknown $\hat{\mu}$, the expression $Q(\hat{\mu}) = (m_1 - \hat{\mu})^2 + (m_2 - \hat{\mu})^2 + \ldots + (m_n - \hat{\mu})^2$ must be minimized with respect to the variable $\hat{\mu}$. The minimizing or best-fitting value of $\hat{\mu}$ is the arithmetic mean $(\overline{m})$ of the observed m's, $\hat{\mu} = \overline{m} = (m_1 + m_2 + \ldots + m_n)/n$, by virtue of the algebraic identity $Q(\hat{\mu}) = Q(\overline{m}) + n(\hat{\mu} - \overline{m})^2$.

More generally, a value y may depend on several quantities $x_1, x_2, \ldots, x_k$ in accordance with a relationship $y = \gamma_1 x_1 + \gamma_2 x_2 + \ldots + \gamma_k x_k + e$, where the γ's are unknown constants and e signifies random error. Such a formula might express, for example, the dependence of the yield y of a chemical reaction on temperature x_1, pressure x_2, and the concentration x_3 of the reacting material. If there were no random error ($e = 0$) then in principle the γ's could be determined exactly by varying the conditions (x's) through a set of k experiments, measuring the corresponding yields (y), and solving simultaneous equations for the γ's. In practice such ideal circumstances almost never arise. Instead, a set of $n \geq k$ experiments is performed and the values of y and the x's for the jth of the n experiments are recorded as $y_j, x_{1j}, x_{2j}, \ldots, x_{kj}$. By the method of least squares the best estimates of the γ's are the numbers $\hat{c}$ which minimize the sum of squared deviations $Q(\hat{c}) = \Sigma_j(y_j - \hat{c}_1 x_{1j} - \hat{c}_2 x_{2j} - \ldots - \hat{c}_k x_{kj})^2$. Let $a_{hi} = \Sigma_j x_{hj} x_{ij}$ and $b_h = \Sigma_j x_{hj} y_j$. When the x's are linearly independent the normal equations $\Sigma_i a_{hi} c_i = b_h$ determine a unique set of c's. The values $\hat{c}_i = c_i$ minimize $Q(\hat{c})$ because of the identity $Q(\hat{c}) = Q(c) + \Sigma_j[\Sigma_i x_{ij}(\hat{c}_i - c_i)]^2$, the second term on the right being positive unless $\hat{c}_i = c_i$, $i = 1, 2, \ldots, k$. The example concerning μ is recognized as a special case, through the identifications $y = m$, $k = 1$, $x_1 = 1$, $\gamma_1 = \mu$, $a_{11} = n$, $b_1 = \Sigma_j m_j$; there is only one normal equation, $nc_1 = \Sigma_j m_j$, and its solution is $c_1 = \overline{m}$.

Detailed justification of the method depends on appropriate assumptions concerning the random error term e, and is a part of that branch of statistical theory known as the analysis of variance. The reader may wish to consult H. Scheffe, *The Analysis of Variance* (1960).

Quite another area of application of the principle of least squares may be briefly indicated. If $f(x)$ is a function with period 2π, to be approximated by a trigonometric polynomial $T(x) = a_0 + a_1 \cos x + \ldots + a_n \cos nx + b_1 \sin x + \ldots + b_n \sin nx$, a natural and convenient measure of the accuracy of the approximation is the quantity $Q(T) = \int_0^{2\pi} [f(x) - T(x)]^2\, dx$, and the least squares best approximation is that which minimizes $Q(T)$. When this is carried through it is found that the familiar Fourier coefficients furnish the solution.

See also FOURIER SERIES.

See R. V. Churchill, *Fourier Series and Boundary Value Problems*, 2nd ed. (1963).

(J. G. Wl.)

LEATHER is animal hide or skin that has been converted by chemical treatment and processing, known as tanning, to a stable and nonputrescible state. The objectives of tanning are to render hides and skins resistant to decomposition or bacterial decay, particularly when wet; to improve certain physical properties, such as tensile strength, flexibility, resilience, abrasion resistance and permeability to water vapour; and to impart to the leather chemical properties such as nonsolubility in water at relatively high temperatures. Untanned hide or skin substance becomes soluble in water at approximately 140° F. (60° C.) while many types of leather remain stable at the boiling point of water.

The principal hides or skins used in the manufacture of leather are sheep- and lambskins, cattle hides, goat- and kidskins and calfskins. These types represent more than 90% of the world production of leather. Other hides and skins used commercially

Common Tannins

Gallotannins		Ellagitannins		Catecholtannins	
Do not produce bloom		Produce bloom		Do not produce bloom	
	Per cent tannin		Per cent tannin		Per cent tannin
Galls (*Quercus infectoria*)	50/60	Myrobalans (*Terminalia chebula*)	33/36	Canaigre (*Rumex hymenosepalum*)	25/30
Sumach (*Rhus coriaria*)	26/30	Divi-divi (*Caesalpinia coriaria*)	39/42	Gambier (*Nauclea gambir*)	35/45
		Valonia (*Quercus aegilops*)	30/40	Hemlock (*Abies canadensis*)	8/20
		Oak bark (*Quercus robur*)	10/12	Larch (*Larix europaea*)	9/10
		Algarobilla (*Caesalpinia brevifolia*)	60/80	Mimosa or golden wattle (*Acacia pycnantha*)	38/40
				Mallet bark (*Eucalyptus occidentalis*)	20/25
Tanning extracts					
Chestnut wood extract (*Castanea vesca*)	26/30	Myrobalan extract (*Terminalia chebula*)	50/55	Oak wood extract (*Quercus family*)	26/28
				Quebracho extract (*Quebracho colorado*)	62/68
				Mimosa extract (*Acacia family*)	62/64

three groups: (1) gallotannins; (2) ellagitannins; and (3) phlobatannins or catecholtannins. For the practical tanner the latter grouping is of most interest. The table shows the most common tannins according to the classification of Perkin; in the table they are classified according to whether they deposit bloom—a crystalline deposition of ellagic acid—during the tanning process; the bloom produces firmness in the finished leather but is objectionable when goods are to be subsequently dyed.

Vegetable-Tanning Processes.—The processes of vegetable tanning may be considered in two distinct groups: (1) the tannage of heavy leathers, such as sole, belting, mechanical and upholstery; and (2) the tannage of light leathers for shoe uppers, linings, fancy goods, bookbindings, etc.

While similar in principle, the techniques differ by virtue of the great variation in weight or substance of raw stock and the solidity or flexibility sought in the finished leather. Throughout the vegetable-tanning process, the strength of tanning liquors is accurately controlled by instruments that record the specific gravity and the acidity of the solutions.

Tannage of Heavy Leather.—In the United States and most other countries, hides to be tanned for sole or other heavy leather are processed in sides, the hide being divided into two portions by cutting down the line of the backbone. After tanning, the finished sides are customarily divided into three main parts, the bend accounting for 50% of the area, the belly and shoulder each representing approximately 25% of the side area. In Great Britain the side usually is cut, or rounded, prior to tanning.

The tannage of sole leather usually consists of three group operations: (1) colouring, by suspending the goods in a series of weak liquors of gradually increasing strength—rocker vats are used in this first stage; (2) laying the material in a series of strong liquors, increasing in strength as the tannage proceeds, the operation being called handling and the series of vats described as handlers or layaway vats; (3) placing the goods for comparatively long periods in layer pits (called layers, or dusters) in a strong liquor after they have been dusted with a small quantity of solid tanning material.

The suspender (colouring) tannage is accomplished in a series of vats containing weak liquors that have been used previously. The sides are usually moved daily into solutions of gradually increasing strength and their position in the same vat is also changed once or twice daily. The length of time and the number of vats used varies in different tanneries.

The goods are moved from the strongest suspender vats to the layaway vats, or floaters. There they are handled daily by being drawn up on the side of the vat, allowed to drain and then transferred, in a horizontal position, to vats of gradually increasing strength of tannin. Handling becomes less necessary as the tannage proceeds. In the last stages of the handler round, it is customary in Great Britain to sprinkle the goods with a little mimosa bark, ground myrobalans or valonia as a preliminary to the layers or dusters.

At the end of the handler round, the goods are usually completely tanned and are then transferred to the layers to contain very strong liquor obtained from the leaches of previous unused tannin or by the addition of chestnut or oak wood extract. The goods may be allowed to remain in the layers for long periods without change, being lifted and transferred into solutions of increasing strength every one or two weeks. This treatment permits the deposition of bloom and produces firmer, harder, heavier and better-wearing leather.

To complete the process, the goods are removed, drained, then scoured to remove the deposited bloom from the grain.

Tannage of Light Leather.—One of the essential differences in the manufacture of calf and other light leather by the vegetable process is that the goods are commonly either bated or thoroughly delimed before tanning. The goods are sometimes pickled after bating; however, this operation may be omitted.

Usually the tannage is begun by suspending the skins in weak astringent, used liquors originally prepared from a mixture of two or more of the following materials: mimosa bark, myrobalans, gambier, quebracho, chestnut or oak wood extract. After the skins have been suspended for a period varying from two to five days, the tannage may be completed in a handler round, the skins being finally given a retannage to lighten the colour by drumming, paddling or suspending in a warm sumac infusion. Alternatively the tannage is sometimes done entirely in paddles using weak liquors in the earlier stages and gradually strengthening the tannin content of the solution by adding quebracho-myrobalan extract, chestnut extract, etc. Because calfskins are dyed in the majority of cases, the usual custom is to avoid bloom-giving tanning materials since the irregular deposition of bloom on the surface of the leather detracts from a level dyeing.

Tannage of Skivers.—Skivers are the grain portions of split skins that have been split in the limed condition. One of the materials most widely used in their manufacture is sumac (*Rhus coriaria*); this material readily produces a white leather that can be dyed any colour. The material, as removed from the splitting machine in limed condition, must be washed, delimed and thoroughly bated, after which it is commonly pickled and then tanned in a paddle wheel. The goods are placed in the paddle wheel with the sumac in the ground leaf form and preferably after having been infused with water for a few minutes at a temperature of 140° F. (60° C.); the tannage is usually begun at a temperature of about 90° F. (32.2° C.). The goods are usually completely tanned within 12 hours; then they may be removed, drained, rinsed in water and hung up to dry.

Vegetable Retannage.—Sometimes certain properties of vegetable tanning are added to leather produced by the chrome process (*see* below) because retanning with vegetable extracts provides leather with physical characteristics of both types. In the case of cattle-hide upper leather, for example, vegetable retannage produces greater plumpness than chrome tanning alone. Combination tannages are also employed for specialized types of leather in order to give them both the abrasion-resistance of chrome leather and the greater thickness of vegetable leather.

Mineral Tannage.—As mentioned previously, tanning with mineral salts, primarily sodium or potassium bichromate, rivals the use of vegetable extracts for the bulk of all light hide and skin leathers. Most shoe upper leather, for example, is produced by chrome tanning.

Alum Process.—The oldest process of tanning with mineral salts is the alum process, still used in the manufacture of some white leather. The proportions of the materials used vary, but the following may be taken as an example: 8 lb. alum, 8 lb. salt, 5 lb. flour and 2 to 4 lb. egg yolk for 100 lb. of prepared skins. It is customary to add all of the ingredients at the beginning of the tanning and to continue the drumming for about two hours until the leather-forming process is completed. The goods are then removed, drained and dried.

Chrome Tanning by the Double-Bath Method.—This process is applied commercially chiefly in the tanning of goatskins

anufacture of *glacé* kid; it is also used in the tannage of ins for willow (smooth) calf and for machinery leathers.

e prepared pelt is first treated with a comparatively weak so- of potassium or sodium bichromate acidified with hydro- or sulfuric acid. After this solution has been absorbed by ins, they are transferred to a solution of sodium thiosulfate), to which hydrochloric or sulfuric acid is added as the re- n process proceeds. The free sulfurous acid produced re- the chromic acid, resulting from the action of the acid on chromate solution, into a basic chromium chloride or a basic lum sulfate salt, the thiosulfate during the reduction proc- dergoing oxidation to sodium tetrathionate and sodium sul- At the same time, sulfur is liberated and deposited in the tices between the fibres as well as in and on the fibres of the The sulfur deposit is one of the principal features that uish leather tanned by the two-bath process from that pro- by the one-bath method.

the modern commercial method the skins are first pickled ulfuric acid and common salt and then are drummed in a n of sodium bichromate and acid. The more complete the tion of chromic acid resulting from the chemical action the , as this has an important influence on the finished leather. the goods have been thoroughly impregnated, they should be bright orange-yellow colour. They are then removed from lution and carefully drained for a minimum of 24 hours, which they are passed through a striking-out (stretching) ne to lay the grain of the skin perfectly flat and remove any les that may have appeared.

colour is reduced in the drum or paddle wheel, but in the f heavy goods it may be done in pits. The following is bly the best procedure: the necessary quantity of sodium ulfate is dissolved and placed in the paddle. About one-third acid required, after dilution, is added to the solution of n thiosulfate. The mixture should be well stirred either by anical paddling, or by hand, with a wooden stirrer; after a inutes the solution will become slightly cloudy as a result cipitation of finely divided sulfur, showing that the reaction gun. Another one-third of the diluted acid is added, and about one hour the remainder. Generally, the reduction place in fairly well-defined stages indicated by the colour of ods. In the early stages there is a change from the original ish orange to a darker yellow and then to a lightly brownish . Later the colour becomes a greenish olive, and finally a luish green.

following are suggested quantities for the two solutions:

first bath	*second bath*
6% bichromate of soda	15% sodium thiosulfate
4½% hydrochloric acid	7½% hydrochloric acid
or	or
13% sulfuric acid	3% sulfuric acid

ome Tanning by the Single-Bath Method.—The single-bath d is used to a greater extent than is the two-bath process, ularly in the case of calfskins intended for box (double- d) and willow or suede finish; hides for side leathers; and kins for gloving, upper leather, linings and fancy purposes. single-bath process is simpler and less liable to produce ar results. The essential difference is that, whereas in the -bath process the basic salt of chromium is formed on the in the single-bath method the basic chromium salt is ap- directly to the skins in solutions of gradually increasing th.

of the simplest methods of preparing a single-bath chrome consists of neutralizing the acid of chromium sulfate or e alum by adding sodium carbonate. The following propor- of sodium carbonate and chrome alum should be used to e the salt, $Cr(OH)SO_4$, which is most generally suitable: ch 1,000 lb. of pelt to be tanned, dissolve 150 lb. chrome in 50 gal. water at a temperature of about 185° to 203° F. to 95° C.). When all the chrome alum has gone into solu- tiously add a solution prepared by dissolving 16 lb. soda 60 lb. washing soda crystals in 25 gal. hot water. When the sodium carbonate has been added, the solution should be thoroughly stirred. The usual procedure is to mix together carefully in a suitable lead-lined tank equal parts of sodium bichromate and concentrated sulfuric acid after dissolving the bichromate in a small quantity of water. The reducing agent is then cautiously added until the colour of the solution is changed from the original orange-yellow to a bright bottle-green.

The following quantities produce a liquor that is considered of a satisfactory chemical composition: 200 lb. bichromate; 200 lb. sulfuric acid (95%); 50 lb. glucose; 100 gal. water. The tannage is carried out on lines more or less identical with those of vegetable leathers, the processing being done either in the drum or paddle wheel for the lighter classes of leather, and by suspension in vats for chrome sole leather, hydraulic (*i.e.*, those used as pump valves, etc.) and similar leathers. Starting with a weak solution, the strength is increased until complete penetration has been effected.

In contrast with vegetable production, leather may be made by the chrome process in hours and days instead of weeks, and greater precision is thereby afforded tanners in controlling the nature of their output. Chrome-tanned leather has exceptionally good wearing properties, high tensile strength and resistance to chemical reagents and it will stand high temperatures in wet or dry condition without detrimental effect.

Oil Tannage.—One of the earliest processes for converting pelt into leather was the application of oil and fatty substances. The object of oil tanning is the substitution of a suitable fish oil for the moisture in the fibres. The goods are first drained and then pressed to express from them as much moisture as possible. They are then hung up to partially dry. This requires careful supervision; if the goods become too dry, the fibres adhere to each other and will not absorb oil. After as much moisture as practicable has been eliminated, the goods are placed in a machine called the stocks. This consists of a semicylindrical vessel in which the goods are subjected to a hammering or beating by two heavy hammers; at the same time the goods are continuously turned over. They are sprinkled with a fish oil, usually cod-liver oil, during the process of stocking or kneading, and are processed until they become sufficiently saturated. They are then further dried, resprinkled with oil and restocked. These operations are repeated until the goods are fully saturated and practically all moisture has been replaced by fish oil. The oil is then decomposed on the fibres by the application of heat.

The modern method of manufacturing chamois leather (made from the flesh split of a sheepskin) and leather from deer, antelope and similar skins consists of impregnation with an oxidizable fish oil when the goods are in a weakly alkaline condition, and subsequently processing them to effect further oxidation of the oil on the fibres. The goods as they leave the splitting machine are relimed to further swell the fibres and decompose the fat. They are then frizzed on the split side. This operation, somewhat similar to that of hand fleshing, consists of using a sharp two-handled knife on a frizzing beam to cut away the coarse-fibred surface or ground from the split side nearest the grain. The goods are then delimed either with a fermented infusion of bran or other flour offal, or a suitable acid.

Solvent Tanning.—Considerable attention has been given to tanning with solvents, such as acetone, in place of aqueous solutions of the tanning agents themselves. Intensely rapid penetration of hide and skin fibres occurs with solvent media, thereby expediting the tanning process enormously and enabling the tanner to make prompt changes in the types of leather produced. It was believed that the commercial introduction of solvent tannage would alter leather technology as radically as the perfection of chrome tanning at the end of the 19th century. Systems of this type call for initial dehydration of hides and skins, after preparatory steps such as those followed in the conventional methods, and subsequent saturation in a solution of solvent and tanning agent.

FINISHING PROCESSES FOLLOWING TANNING

Upon leaving either the vegetable tanyard or the chrome tanning drums, leather is in a condition described as rough tanned and must be subjected to a series of finishing steps. These operations

give the product necessary solidity or flexibility, lubricate the fibres by replacing the natural oils lost in tanning, dye or colour the stock and give the surface one of the various finishes associated with leather.

Drying.—An important stage in the final manufacture of leather is the drying of the hides and skins after tanning. Humidity and temperature control are imperative in the drying process in order to maintain proper hydroscopic balance, to avoid deformation of surface and fibres by nonuniform evaporation of moisture and to condition the leather for subsequent stages of manufacture. Heavy leathers, such as sole, are dried by hanging in a ventilated dry loft. The leather is suspended from hooks on a series of horizontal rods arranged so that the current of air through the loft moves uniformly against the leather. A light coating of oil is usually applied to the wet leather before hanging in the dry loft to protect against excessive drying of the grain surface and to ensure that evaporation of moisture from the flesh side is uniform. Evenness of colour and temper (relative softness) in the finished leather depends largely on the rate of evaporation during the drying process. Heavy leather must be dried more slowly than lightweight or thin leather. Vegetable-tanned leather is dried at a slower rate than chrome-tanned leather, which can be brought to a proper state of dehumidification at comparatively high temperatures.

Tunnel drying, in which hides and skins move continuously through an enclosed tunnel under controlled heat and humidity conditions, came to be almost universally employed. Uniform rates of evaporation are thereby achieved with the final condition of the leather predetermined. Suspension of the hides and skins as they move through the drying tunnels is carried out by several methods. In the method termed pasting, skins or sides of leather are affixed with suitable pastes or mountants to clean glass or metal plates that then move automatically through the drying tunnels while suspended from overhead rails. An innovation in drying procedure was the use of infrared lamps in banks over conveyors on which skins and sides are carried.

Fat-Liquoring.—After leather has been tanned and dried, it is generally hard and stiff, lacking in pliability, mellowness and fullness. Blended oils and greases must be incorporated into the leather to give it the required softness, add to its wearability and strength and also increase resistance to cracking. Older methods of applying oils and greases, chiefly by surface deposition on wet or dry leather, were generally supplanted by the modern process of fat-liquoring. Emulsions of oil in water are utilized to secure uniform penetration and coating of leather fibres. Since oils are generally insoluble in water, soaps are used to produce stable emulsions. When wet leather is drummed with such emulsions, the tiny globules of oil penetrate the leather and combine with the fibres. Many different kinds of oils are used in fat-liquoring leather, and the choice of oil depends upon the characteristics desired in the finished leather, as well as the adaptability of the oil to the specific process used in tanning and finishing.

Currying and Stuffing.—In the production of some kinds of leather a higher grease or oil content is desired than can be obtained by the use of fat liquors. The process formerly used to impregnate any kind of leather with greases was that of currying, but in modern practice that operation is usually reserved for heavy leathers, such as belting, harness and machinery types. Lighter leathers, such as upper leather intended for hunting boots or work shoes, may be "stuffed" with microcrystalline greases to secure maximum pliability and water resistance.

Goods to be stuffed are split or shaved after tanning and drying and then are scoured either by hand or machine until the grain surface is thoroughly cleansed of bloom and excess tannins. The leather may then be retanned to obtain a better colour, after which it is ready for grease impregnation.

Grease impregnation may be done in three different ways: (1) hand stuffing; (2) drum stuffing; and (3) dipping. Hand stuffing consists in applying to the previously moistened leather a thick layer of dubbing prepared by mixing together about equal parts of beef tallow and cod-liver oil. The application is made, usually to the flesh side of the leather, with a brush, and the leather is afterward slowly dried. As drying proceeds by evapo more oily portions of the dubbing are absorbed by capill become thoroughly distributed and absorbed by the fibr stuffing consists in drumming the leather, which has be ously put into an equable condition of moisture by damp drum heated either by live steam or by hot air circulate the vessel. Dipping is practised chiefly upon heavy lea example, harness backs and strapping, and consists of the leather, which has been well dried previously, in a with molten grease (usually parafin wax). The drie offers little resistance to the penetration of the molten complete permeation is effected in a few minutes. The nation is not so satisfactory as drum or hand stuffing b the nonoxidizable and slight lubricating properties of th

Dyeing.—Colour is imparted to leather either by dy applying pigment to the surface. Leather is sometime (*i.e.*, dyed with a basic dye) to attain uniformity of th prior to treatment with pigment finishes. Aniline dy quently used to impart depth of colour and enhance th grain texture of the leather. The most widely employed of dyeing are: (1) drum dyeing; (2) spraying; (3) bru or staining.

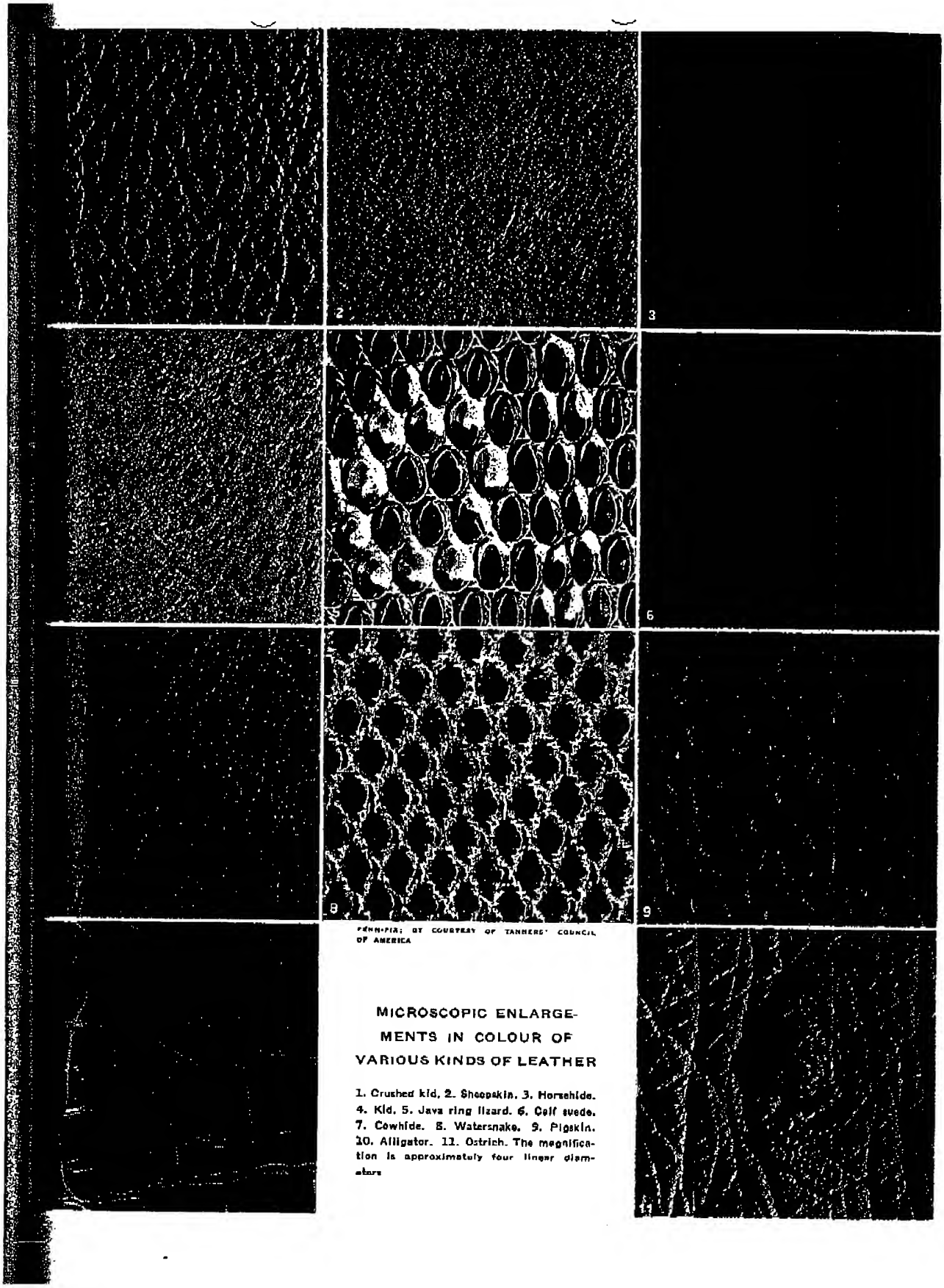
Drum dyeing and spraying are the most important me dyeing and colouring various kinds of leather. In the operation, skins are tumbled in revolving drums containi compounds, with provision for maintenance of required tures. The choice of acid or basic dyes is dictated by standards desired or by tanning procedures and subsequ ing steps. In the spray method the dyes are applied to in an atomized state with pressure spray guns. Sprayin automatic sprayers geared to the movement of a con may be used. Spraying is also employed to deposi colour in the form of insoluble pigments that are su water or lacquer mediums. Pigment compounds may b with binding agents such as casein, shellac or lacquer coats aid the tanner in securing uniformity in colour an hue.

Brush dyeing can be utilized in colouring heavy type such as upholstery hides, luggage and strap sides, an specialty leathers. A weak solution of the dye is brus surface of suitably prepared leather; usually two or th cations are given to obtain regularity of colour. A simil is sometimes used in colouring glove leathers, partic colour is desired only on the exterior of the glove.

Final Finishing.—A major series of final operati tannery can be broadly described as finishing. This d in meaning from the rolling and polishing of sole leat buffing that produces the fine, napped surface of suede may be said to compare in importance with the basic o eration. Methods, procedures and materials used in ma with the kind of texture, surface, gloss and appearance in the final product. The following are the principles f finishing several major categories of leather.

Sole Leather.—To obtain the requisite degree of m solidity for satisfactory wearing qualities and ease of m facturing, sole leather must be compressed before it tannery. This is done mechanically either by rolling o ing under considerable pressure. In the United State Britain, sole leather is commonly rolled, initially in damp condition and afterward in the dry state, on a type of heavy rolling machine that produces heavy pe heat at the moment of impact against the leather development in the United States, pneumatic machine ployed to compact sole leather automatically.

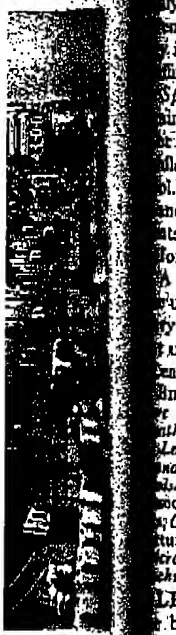
Upper Leather.—Complex systems of upper leather m demanded by the contemporary diversity of upper shoes. The first step for almost all upper leather is operation. This consists essentially of mechanical m of hides and skins to loosen fibres and impart a require softness. The flexing action of the machinery used to pose is regulated in accordance with the denseness of the leather. After staking, leather is buffed on the fle



PENN-PIX; BY COURTESY OF TANNERS' COUNCIL OF AMERICA

MICROSCOPIC ENLARGEMENTS IN COLOUR OF VARIOUS KINDS OF LEATHER

1. Crushed kid. 2. Sheepskin. 3. Horsehide. 4. Kid. 5. Java ring lizard. 6. Calf suede. 7. Cowhide. 8. Watersnake. 9. Pigskin. 10. Alligator. 11. Ostrich. The magnification is approximately four linear diameters



fing machine, in which a rapidly rotating cylinder covered with asive material gives a uniform nap. When cattle hides are to tanned or used in less than the full thickness, *e.g.*, for shoe up-s, they are split in cross section by machines with finely adjusted d knives. The upper or grain layer of the hide is the principal oduct and is described as grain side leather. The flesh cut is own as a split and may be tanned or finished separately.

Leather that is to have a smooth, polished or lustrous finish is bjected to a series of related processing steps. These are in-ded to create a surface that is integrated with the leather, re-tant to abrasion, capable of withstanding wetting and tempera-e variations and does not impair the ability of leather to nspire moisture. To achieve these qualities, several coats of pared finish, in which dye or pigment may be included, are plied in succession to the leather. Materials ranging from casein, umin and wax to complex resins and lacquers are embodied the finish formulas. These are applied by machines or hand ough sprays or rollers. When a highly polished surface is to produced, leather is glazed on a machine that rapidly moves olid glass cylinder against the leather under considerable pres-e. Each stroke of the "glazing jack" creates heat and friction, ich plasticize the finish and impart high lustre to the leather.

A grained effect is achieved through boarding by hand or ma-ine. The skin is doubled, grain surface inside, and pressure is plied to the doubled portions in the required direction either by nd or with a cork-covered board, or by rotating cork-covered finders. The natural grain of leather is thereby enhanced and ought into sharper definition. Following boarding, the leather y be smoothed by placing the grain surface under heavy pres-e with a flat polished steel plate. Pressure embossing machines great weight are sometimes used to produce distinctive grain tures or printed effects. In this process, prior to or during fin-ing the grain surface of the leather is brought into contact with engraved plate carrying the required pattern or design. Under mbination of heat and high pressure, the pattern embossed or nted on the leather becomes permanent.

In suede leathers, a fine uniform nap is desired. This is achieved applying to the flesh side of the skin a rapidly rotating cylinder ered with emery or carborundum abrasives. Pressure is care-ly adjusted and regulated to abrade fibres sufficiently so that an n, velvety surface is produced. Air-brushing or other machin-, is employed to remove the fine leather dust resulting from the ing action.

Special Finishes.—Morocco is goatskin leather that has been nished by hand after glazing on a special type of glazing machine. e natural grain is raised and accentuated by working the skin ile wet in five or more directions with a cork-covered graining ol. Drying the skin at a high temperature fixes the grain per-anently. Patent leather bears a finish produced by successive ats of compounds incorporating linseed oil, each coat being dried fore application of the next.

A high degree of resistance to abrasion is achieved through use of urethane finish compounds. Development in the chem-ry of urethane finishes led to increased use of these materials upper leather and luggage leathers. *See* also references under eather" in the Index.

BIBLIOGRAPHY.—J. A. Wilson, *Modern Practice in Leather Manufac-e* (1941); G. D. McLaughlin and E. R. Theis, *The Chemistry of ather Manufacture* (1945); Tanners' Council of America, *Dictionary Leather Terminology*, 5th ed. (1957); D. Woodroffe (ed.), *Standard andbook of Industrial Leathers* (1949), *Leather Dressing, Dyeing and nishing* (1953); J. S. Mudd, *Leather Finishes* (1955); National Hide sociation, *Hides and Skins* (1956); Society of Leather Trades' Chem-s, *Official Methods of Analysis*, 3rd ed. (1957); British Leather Manu-acturers' Research Association, *Hides, Skins and Leather Under the croscope* (1957); F. O'Flaherty *et al.* (eds.), *The Chemistry and chnology of Leather* (1962). (I. R. G.)

LEAVIS, F(RANK) R(AYMOND) (1895–), one of best known and most controversial of 20th-century British tics. Born on July 14, 1895, at Cambridge, and educated there, the Perse School and at Emmanuel College, he has been mainly sociated with Cambridge University, in particular with Downing llege of which he was a fellow (1936–62). His fame as a cher of English literature there was reinforced and widened by his influence as a founder, and the editor, of the quarterly *Scrutiny* (1932–53).

Leavis' work consists mainly of criticism, but he has also written on social problems and education. His outlook is pessimistic; he accepts the view of modern civilization of such poems as Ezra Pound's *Hugh Selwyn Mauberley* (1920) and T. S. Eliot's *The Waste Land* (1922). He sees modern urban life as rootless and aimless. "Mass production," "standardization," "leveling-down"; the dependence of the mass media on advertising and salesmanship; acceleration of social change—all these, he thinks, have had a debasing, demoralizing effect. Even the educated minority has disintegrated, while popular taste has fallen to an unprecedentedly low level. For this last proposition Leavis' wife, Q. D. Leavis, provided documentation in her *Fiction and the Reading Public* (1932).

In these depressing, confused conditions, education seemed to him the only hope. Hence, in *Culture and Environment* (1933; with Denys Thompson), he advocated counterpropagandist work for schoolteachers; put forward plans for a better university English faculty in *Education and the University* (1943); and in *Scrutiny* encouraged a tone of urgency and missionary endeavour.

Leavis' criticism falls into two phases. In the first, influenced by Eliot, he devoted his attention to English verse. *New Bearings in English Poetry* (1932) proposed "a new chart" for modern poetry and "made Eliot a key figure"; and in *Revaluation* (1936) he extended his survey, on similar critical principles, back to the 17th century. In the 1940s, his interest moved toward the novel. *The Great Tradition* (1948) made a challenging reassessment of English fiction: together with Jane Austen, he proclaimed George Eliot, Henry James, and Joseph Conrad as the great novelists of the past, and D. H. Lawrence as their only successor. This shift seems to have coincided with a growing conviction that Lawrence, not Eliot, was the greatest writer of modern times; and in *D. H. Lawrence: Novelist* (1955) he gave an enthusiastic account of an author about whom he had earlier written with greater reserve. After 1955 other novelists, notably Dickens and Tolstoi, engaged his attention (*see* his *Anna Karenina and Other Essays*, 1968). But perhaps the collection *The Common Pursuit* (1952) best shows his range.

Leavis' criticism has aroused strong feelings. He has always expressed his opinions with severity and has been accused of contentiousness, dogmatism, and narrowness. His belief that important literature should be closely related to a criticism of life, and therefore that it is a literary critic's duty to assess works according to the author's moral position, has been seen by some as strengthening, but by others as narrowing, the critical function. Yet, when treating authors to whom he is sympathetic, he shows an intense concern, a sensitiveness and penetration, which has few rivals in English criticism.

See Vincent Buckley, *Poetry and Morality* (1959); Andor Gomme, *Attitudes to Criticism* (1966). (W. W. Ro.)

LEBANON (Arabic AL JUMHURIYAH AL LUBNANIYAH or AL LUBNAN; French LIBAN), an Arab republic situated on the eastern shore of the Mediterranean Sea and bounded on the north and east by Syria and on the south by Israel. The state came into existence in 1920 when France, then occupying Syria and Lebanon, enlarged the former autonomous Ottoman sanjak of Mount Lebanon, which coincided with the Christian region of the Mountain. The Free French declared Lebanon independent in 1941 and French troops withdrew in 1946. Lebanon has a maximum length of 135 mi. (217 km.) and is 20 to 35 mi. (32 to 56 km.) wide. Its land area is 4,015 sq.mi. (10,400 sq.km.). The capital is Beirut (*q.v.*).

Physical Geography.—Lebanon is predominantly a mountainous country of great scenic beauty. From west to east it comprises four geographical regions which coincide with relief. A narrow coastal plain fringes the Mediterranean. This is dominated on the east by Mt. Lebanon which geographically is a mountain region extending for about 30 mi. (48 km.) north and south of Beirut. Between Mt. Lebanon and the ranges of Anti-Lebanon and Mt. Hermon lies the narrow cleft of the Bekaa (El Bika or Al Biqa') Valley (ancient Coele-Syria) which is about 10 mi. (16 km.) wide and 80 mi. (130 km.) long. The Syrian-Lebanese

Exhibit B

http://www.ftc.gov/os/statutes/textile/gd-leath.htm#24.1mime text/html

GUIDES FOR SELECT LEATHER AND IMITATION LEATHER PRODUCTS

16 C.F.R., Section 24

Table of Contents

---

§ 24.0 Scope and purpose of guides.

(a) The Guides in this part apply to the manufacture, sale, distribution, marketing, or advertising of all kinds or types of leather or simulated-leather trunks, suitcases, traveling bags, sample cases, instrument cases, brief cases, ring binders, billfolds, wallets, key cases, coin purses, card cases, French purses, dressing cases, stud boxes, tie cases, jewel boxes, travel kits, gadget bags, camera bags, ladies' handbags, shoulder bags, purses, pocketbooks, footwear, belts (when not sold as part of a garment) and similar articles (hereinafter, "industry products").

(b) These Guides represent administrative interpretations of laws administered by the Federal Trade Commission for the guidance of the public in conducting its affairs in conformity with legal requirements. These Guides specifically address the application of section 5 of the FTC Act (15 U.S.C. 45) to the manufacture, sale, distribution, marketing, and advertising of industry products listed in paragraph (a) of this section. They provide the basis for voluntary compliance with such laws by members of industry. Conduct inconsistent with the positions articulated in these Guides may result in corrective action by the Commission under section 5 if, after investigation, the Commission has reason to believe that the behavior falls within the scope of conduct declared unlawful by the statute.

§ 24.1 Deception (general).

It is unfair or deceptive to misrepresent, directly or by implication, the kind, grade, quality, quantity, material content, thickness, finish, serviceability, durability, price, origin, size, weight, ease of cleaning, construction, manufacture, processing, distribution, or any other material aspect of an industry product.

§ 24.2 Deception as to composition.

It is unfair or deceptive to misrepresent, directly or by implication, the composition of any industry product or part thereof. It is unfair or deceptive to use the unqualified term "leather" or other unqualified terms suggestive of leather to describe industry products unless the industry product so described is composed in all substantial parts of leather.[1] This section includes, but is not limited to, the following:

(a) Imitation or simulated leather. If all or part of an industry product is made of non-leather material that appears to be leather, the fact that the material is not leather, or the general nature of the material as something other than leather, should be disclosed. For example: Not leather; Imitation leather; Simulated leather; Vinyl; Vinyl coated fabric; or Plastic.

(b) Embossed or processed leather. The kind and type of leather from which an industry product is made should be disclosed when all or part of the product has been embossed, dyed, or otherwise processed so as to simulate the appearance of a different kind or type of leather. For example:

(1) An industry product made wholly of top grain cowhide that has been processed so as to imitate pigskin may be represented as being made of Top Grain Cowhide.

(2) Any additional representation concerning the simulated appearance of an industry product composed of leather should be immediately accompanied by a disclosure of the kind and type of leather in the product. For example: Top Grain Cowhide With Simulated Pigskin Grain.

(c) Backing material.

(1) The backing of any material in an industry product with another kind of material should be disclosed when the backing is not apparent upon casual inspection of the product, or when a representation is made which, absent such disclosure, would be misleading as to the product's composition. For example: Top Grain Cowhide Backed With Vinyl.

(2) The composition of the different backing material should be disclosed if it is visible and consists of non-leather material with the appearance of leather, or leather processed so as to simulate a different kind of leather.

(d) Misuse of trade names, etc. A trade name, coined name, trademark, or other word or term, or any depiction or device should not be used if it misrepresents, directly or by implication, that an industry product is made in whole or in part from animal skin or hide, or that material in an industry product is leather or other material. This includes, among other practices, the use of a stamp, tag, label, card, or other device in the shape of a tanned hide or skin or in the shape of a silhouette of an animal, in connection with any industry product that has the appearance of leather but that is not made wholly or in substantial part from animal skin or hide.

(e) Misrepresentation that product is wholly of a particular composition. A misrepresentation should not be made, directly or by implication, that an industry product is made wholly of a particular composition. A representation as to the composition of a

particular part of a product should clearly indicate the part to which the representation applies.[2] Where a product is made principally of leather but has certain non-leather parts that appear to be leather, the product may be described as made of leather so long as accompanied by clear disclosure of the non-leather parts. For example:

(1) An industry product made of top grain cowhide except for frame covering, gussets, and partitions that are made of plastic but have the appearance of leather may be described as: Top Grain Cowhide With Plastic Frame Covering, Gussets and Partitions; or Top Grain Cowhide With Gussets, Frame Covering and Partitions Made of Non-Leather Material.

(2) An industry product made throughout, except for hardware, of vinyl backed with cowhide may be described as: Vinyl Backed With Cowhide (See also disclosure provision concerning use of backing material in paragraph (c) of this section).

(3) An industry product made of top grain cowhide except for partitions and stay, which are made of plastic-coated fabric but have the appearance of leather, may be described as: Top Grain Cowhide With Partitions and Stay Made of Non-leather Material; or Top Grain Cowhide With Partitions and Stay Made of Plastic-Coated Fabric.

(f) Ground, pulverized, shredded, reconstituted, or bonded leather. A material in an industry product that contains ground, pulverized, shredded, reconstituted, or bonded leather and thus is not wholly the hide of an animal should not be represented, directly or by implication, as being leather. This provision does not preclude an accurate representation as to the ground, pulverized, shredded, reconstituted, or bonded leather content of the material. However, if the material appears to be leather, it should be accompanied by either:

(1) An adequate disclosure as described by paragraph (a) of this section; or

(2) If the terms "ground leather," "pulverized leather," "shredded leather," "reconstituted leather," or "bonded leather" are used, a disclosure of the percentage of leather fibers and the percentage of non-leather substances contained in the material. For example: An industry product made of a composition material consisting of 60% shredded leather fibers may be described as: Bonded Leather Containing 60% Leather Fibers and 40% Non-leather Substances.

(g) Form of disclosures under this section. All disclosures product, or on a tag, label, or card attached to the product, and should be affixed so as to remain on or attached to the product until received by the consumer purchaser. All such disclosures should also appear in all advertising of such products irrespective of the media used whenever statements, representations, or depictions appear in such advertising which, absent such disclosures, serve to create a false impression that the products, or parts thereof, are of a certain kind of composition. The disclosures affixed to products and made in advertising should be of such conspicuousness and clarity as to be noted by purchasers and prospective purchasers casually inspecting the products or casually reading, or listening to, such advertising. A disclosure necessitated by a particular representation should be in close conjunction with

the representation.

§ 24.3 Misuse of the terms "waterproof," "dustproof," "warpproof," "scuffproof," "scratchproof," "scuff resistant," and "scratch resistant."

It is unfair or deceptive to:

(a) Use the term "Waterproof" to describe all or part of an industry product unless the designated product or material prevents water from contact with its contents under normal conditions of intended use during the anticipated life of the product or material.

(b) Use the term "Dustproof" to describe an industry product unless the product is so constructed that when it is closed dust cannot enter it.

(c) Use the term "Warpproof" to describe all or part of an industry product unless the designated product or part is such that it cannot warp.

(d) Use the term "Scuffproof," "Scratchproof," or other terms indicating that the product is not subject to wear in any other respect, to describe an industry product unless the outside surface of the product is immune to scratches or scuff marks, or is not subject to wear as represented.

(e) Use the term "Scuff Resistant," "Scratch Resistant," or other terms indicating that the product is resistant to wear in any other respect, unless there is a basis for the representation and the outside surface of the product is meaningfully and significantly resistant to scuffing, scratches, or to wear as represented.

Footnotes

1. For purposes of these Guides, footwear is composed of three parts: the upper, the lining and sock, and the outersole. These three parts are defined as follows: (1) The upper is the outer face of the structural element which is attached to the outersole; (2) the lining and sock are the lining of the upper and the insole, constituting the inside of the footwear article; and (3) the outersole is the bottom part of the footwear article subjected to abrasive wear and attached to the upper.

2. With regard to footwear, it is sufficient to disclose the presence of non-leather materials in the upper, the lining and sock, or the outersole, provided that the disclosure is made according to predominance of materials. For example, if the majority of the upper is composed of manmade material: Upper of manmade materials and leather.

post□|□lMXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
□z÷t|□lML²`R,»}ûþ7L6O□cat @□z÷t|□lML²`R,»}ûþ7L6O□□ÿÿþ□aux
@SURL8http://www.ftc.gov/os/statutes/textile/gd-leath.htm#24.1

Exhibit C

http://www.bugatti.com/Information

Leather Quality Information

by

Terry Scheller

pres. Bugatti, Inc.

Index:

Preface/background: 30 years ago I performed a cost analysis for a leather tannery. During most of my career I have purchased and sold leather and leather goods as well as making leather goods. During this time I have talked with hundreds of people that process leather. Over this time period I have learned about leather from the following companies which I purchased (usually just the assets): Manon Handbags, Lorraine Handbags, New England Leather Accessories and Leather World Manufacturing.

Leather knowledge is not rocket science, but still, there's a lot of misinformation about leather. I'd like to try to explain to the general public as well as to others in the industry what some of the definitions really mean, as well as what they now mean in common use.

Real leather is composed of many microscopic fibers which are inter-linked. When leather is used, it bends and the fibers bend and rub against each other. When it was alive and connected to the oil ducts of the animal, the fibers were all naturally lubricated. During tanning, the oils are first extracted, then later replaced with other oils (usually called "fat liquors.") Once the leather has been tanned, these oils will eventually dissipate (faster in hot weather and exposed to the sun). At this point oils must be reapplied to the leather or the fibers will start cutting into each other as the leather bends and flexes; cut fibers result in cracks in the leather. Once leather develops cracks, the cracks cannot be repaired, although further cracking can be prevented by applying oil or conditioners to the leather. Silicone waterproofing is only a surface coat and will not properly lubricate the leather fibers. Silicone can prevent oils from entering and lubricating leather so is only a quick fix for water-proofing. I personally prefer a natural oil although it will darken most leathers. A general purpose leather lotion or even hand lotion will replenish fiber lubrication and some will not darken the leather except temporarily.

Napa leather: Originally, only sheepskin was referred to as "napa." However, in recent years, the word "napa" has become an adjective meaning "soft," as in "napa cowhide;" this is really a misnomer. If it looks good and feels good, it is probably, but not always a better, more expensive grade of leather. The touch of the leather is called the "hand" of the leather, and the way the fingers slide across the surface is called "drag." My preference is that the ideal soft leather hand be similar to the feel of a baby's skin. A napa leather, or sheep/lambskin, is naturally one of the softest leathers and is closest in "hand" to a baby's skin.; a great tanning technician can approach this "hand" with lambskin.

The best leather is full grain leather. The reason it is best is because it is usually the strongest part of the leather. At the top of the skin, or epidermis level, fibers are tighter together and hence stronger. In order to be considered "full grain leather" the leather cannot have been buffed or sanded on the top. Therefore, at the surface the leather fibers are most closely inter linked, and hence strongest. When any of these fibers are buffed (sanded) in order to reduce the number of apparent blemishes, leather's natural strength diminishes. Bugatti® uses full grain leather for making most of its leather goods.

Only the best (least damaged) skins can be used for making full grain leather. The more natural the dye and top coatings, the more transparent they are. These transparent dyes are usually aniline. Only a small percentage of skins can be used to produce an aniline dyed full grain leather. Cowhide originating as a by-product from USA and Western European beef provides most of the top quality full grain cowhide. This is because cows in most other countries are not as protected by pesticides and enclosures. Brazil, for example, has large herds of cattle, but their hides are marked with thorns, horns, insects, etc. so that almost none of their hides are used to produce full grain leather. Full grain leather may be hot plated or not, the plating (done with a large metal plate which has usually been etched to look like a perfect full grain leather) being added to hide some of the natural defects in leather.

Top grain leather is full grain leather that has usually been buffed and has originated from the top of the skin. I know it's confusing to many people so will explain further. Both top grain and full grain leather are considered "top grain" because they originate from the top or outside layer of the skin. However, not all top grain leather is full grain leather. Most top grain leather will be buffed then hot stamped with an enormous metal plate. Many times a finely finished top grain can be quite nice, with a variety of textures and finishes, but a cheap and poorly executed top grain on an inferior quality skin can look worse than plastic. Metal plates can simulate large grain cow or fine grain calf as well as ostrich, alligator, basket weave, or flowers. The finest leathers do not need to be plated, but are rare in a world of bugs, barbs, bumps, bruises and brands.

Leather can still qualify as "top grain" or "genuine leather" even though it has been buffed. The buffing process involves sanding off the surface blemishes. The mildest form of buffing leather is called "snuffing," (as in, "Has the leather been snuffed?) Taken to the extreme, the sanding can remove almost all of the natural hair cells of a cheaper leather such as pig (where the pores are unusually pronounced), hence, in this process the leather is weakened

because most of the tightest leather fibers are removed. These cheaper grades of top grain leather are usually sprayed with a pigment die (see color).

The cheapest grades of "genuine leather" usually use the cheapest hides (such as pigskin) to replicate cowhide (it can still legally be called "genuine leather.") The best tanneries produce excellent top grain leathers because they only lightly snuff the leather and use top quality finishes and processes to duplicate the look of full grain leather. Often a smooth metal plate or hair cell metal plate is applied with heat and pressure to "kiss plate" the leather, or iron out wrinkles and some irregularities and provide a higher yield of cutting. Sometimes plating is done on a high quality calfskin to replicate reptile skins. The Italian tanneries produce fine cowhide leather replicas of alligator because they use high quality etched plates and spend a lot of time and care applying multiple layers of dyes.

Nu-buc and top grain suede: are top grain leathers with the grain raised to a velvety feel at the best. These types of suede are stronger, have a finer nap, and are more expensive than split suedes.

Split leather and split suede: are weaker than top grain leather, and is usually, but not always, less expensive. It is the layer of the leather which is closer to the meat. In this layer, the fibers are not as closely linked and are looser than in the top grain. This is why split leather is weaker than top grain leather (given the same thickness and animal). However, a very thick split leather can be stronger than a thin top grain leather. Cowboys still often use heavy suede chaps for protection. Bugatti® makes several tote bags of heavy suede which have long lifetimes, even when used as a tool bags. According to some seldom enforced federal laws, split leather must be labeled as such. Sometimes the split may be stronger, more attractive, more expensive, and hence better than a cheap top grain pigskin that has had enough of its epidermis removed to get down to the "split" in a different way. If the method of doing it is via buffing, it supposedly still qualifies as "top grain" or "genuine leather."

Finished split leather: is split suede with a spray coating of color pigment, bonding agents, etc. which has been plated with a hair cell hot stamp. It is usually, but not always, weaker than top grain leather. When a urethane coating or PU (polyurethane) film is laminated to leather, usually it is laminated to split leather, but once it has been laminated it becomes impossible to tell whether it was laminated to a top grain or a split. Urethane coatings are usually very tough and in many cases stronger than top grain leathers, but the range of qualities in the coatings also varies with the price. Depending on the substrata and the coating it can be stronger than some top grain leathers, and sometimes more attractive and more expensive than a poor top grain leather.

Bonded leather: Many companies brand items that are not legally "top grain leather" or "genuine leather" as "leather" or "genuine goat grain". The problem is that they don't say goat grain "what". Bonded leather is composed of ground leather so that it is reduced to short fibers. They are then mixed with glue and pressed into sheets, then colored with the same coatings used on leathers. If you are looking at a stiff leather, looks can be deceiving. Bonded leather is only as strong as its thickness, the material to which it may be laminated,

and the possible addition of a top urethane coat. Poor bonded leathers are weak and will not last long with use. The best bonded leathers will last longer, but not as long as genuine leather.

Types of leather (animal): Leather is primarily a by-product from an animal used for food. Mink is one of the few animals which is raised primarily for its skin or pelt. Cowhide is probably the most popular, and is relatively strong. For its strength and also because of its "breathability", it is still the best material for shoes and many personal accessories. Crocodile, lizard, water buffalo, and goat are other durable skins. Sheep skin and especially lambskin, are relatively weak and will not last as long as the other leathers just mentioned, however, they are especially soft.

Color: The coatings applied to leather vary in strength and appearance The more transparent the dye and more natural looking the skin, the higher the price and quality. Aniline dyes are considered the best; they are transparent dyes which are usually added in a drum and preserve the transparency. Thicker pigment (more opaque) colors are sprayed on, not only for color, but also to hide blemishes and imperfections in the skin. Sometimes many different combination pigment layers contribute to a "semi aniline" look that has a bit of depth

Design considerations: On the other hand, in order to craft many items for maximum durability I would choose a thicker leather (which never feels as soft as a similar thinner leather). Good leather goods designs are done with the thought of the type of leather to be used in mind. Also, certain types of designs perform best with certain characteristics of leather. For example, if I wanted a briefcase to stand up, I would usually choose a thicker leather with more "stand up." Fortunately, this leather description is similar. A leather with more "stand up" is stiffer and not so floppy as soft leather. Generally the thinner leathers are softer, but much of the "stand up" can be adjusted during tanning and finishing.

Cost: varies according to the scarcity and demand for a particular type of animal skin as well as in the cleanliness of the skin, and the art and types of finishes applied. A clean and elegantly tanned and finished calfskin costs three times as much as a cowhide from an older animal whose skin is full of scratches, bug bites, skin diseases, etc. and must be heavily corrected to cover the natural marks which many people call "imperfections." Ostrich and alligator are among the more expensive types of leather. Rare types of leather are monitored by US Fish and Wildlife to make sure that the skins have originated on special farms or areas not suffering from endangered species regulation. Ostrich and alligator are now raised commercially for meat and hides. If a skin is rare and exotic, it is probably illegal to bring it into the United States. If you try to impord a leather product made from an endangered species, it should be confiscated and is a crime.

Recommendations: When looking for quality, look to a reputable manufacturer who makes high quality products and provides customer satisfaction. Remember, some of the best leather easity shows marks, liquids, etc. If what you really want is a tough surface, look for that.

Bugatti® home page

post□á£Â@XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
bÂeéá£Â@L°å¯u»}û <ï;á□cat @bÂeéá£Â@L°å¯u»}û <ï;á□ □ÿÿþ□aux
OSURLGhttp://www.bugatti.com/Information%20about%20leather.html#anchor8029195

Exhibit D

http://www.travel-goods.org/articles/leather.htmlmime text/html

SHOWCASE International November/December 1989 Issue

Update on Leather Terminology

If you're a manufacturer selling leather goods to the retailer, or if you're a retailer selling leather products to the consumer, you should be aware of the current leather terminology and requirements as they pertain to the luggage and leather goods industry.

Leather goods, with the exception of handbags, require a label disclosing the composition of the materials used. According to the Federal Trade Commission, the disclosure must appear in the form of a stamping on the product, or on a tag, label or card "attached to and affixed with such degree of permanence as to remain on or attached to the product until it is received by the consumer purchaser." As well, the labeling should be correct as to not deceive potential purchasers by claiming the product is made of a material that it is not.

One of the thorns in the side of manufacturers, retailers and consumers alike is labeling that states that a product is made of "Genuine Bonded Leather." There is no such animal. It doesn't matter how many times you have seen this label or heard of "bonded leather," it exists only as a method of creating simulated or imitation leather. Robert Sacks, legal counsel for the LLGMA, has been working with the Federal Trade Commission on this matter of terminology. As of this writing, the FTC has not sanctioned the term "bonded leather." In fact, the FTC Guides prohibit any representation directly or by implication that a material in an industry product is leather, if such material contains grounded, pulverized or shredded leather and thus is not wholly the hide of an animal. Neither split leather or shredded, ground or pulverized leather may use or assume the term "genuine leather." (SHOWCASE will keep you advised as to any new developments that occur pertaining to FTC Guidelines.)

According to the Tanner's Council of America, our industry uses hides from steer, cows, bulls, sheep, lamb, goat and kid, horses, goat, ass, mule, zebra, pig, hog, peccary and carpincho, land and water buffalo (not American Bison) and exotic and fancy feathers such as frog, ostrich, crocodile, lizard, snake, seal, shark, walrus, turtle, and camel to produce products.

This council also clarifies a number of definitions that are commonly used in the leather industry. We gratefully acknowledge the Council's Dictionary of Leather Terminology, as well as the organization's publication, "Leather Facts," as we highlight some of the words we use daily in our business:

LEATHER

A general term for hide or skin with its original fibrous structure more or less intact, tanned or treated to be non-putrescible. The hair or wool may or may not have been removed. Leather is also made from a hide or skin which has been split into layers or segmented before or after tanning, but if the tanned hide or skin is disintegrated mechanically and/or chemically into fibrous particles, small pieces or powders and then, with or without the combination of a binding agent, is made into sheets or forms, such sheets or forms are not leather. Leathers may have surface coatings of a reasonable amount, but beyond this the resulting products shall be described as a laminate or composite. However, the term laminated leather shall not be used if the leather content is less than two-thirds of the total thickness.

In describing various classes of leather, the name of the animal from which the skin or hide was taken is generally used. Certain exceptions, which have become established trade practices, are cited in the definitions which follow. Otherwise, adequate explanations should be made.

ANILINE FINISH or ANILINE-DYED LEATHER
Leather which has been colored by dyes as distinguished from other leather treated by pigments or other opaque materials.

BARK OR VEGETABLE TANNED
Leathers which have been tanned with vegetable materials that are derived from certain plants and woods.

BELTING LEATHER
For the manufacturers of leather belts for transmitting power in machinery. Made from the butts of high grade cattle hides.

BUFFED
Leather which has been smoothed or sueded by mechanical sanding.

CALFSKIN LEATHER
Leather made from the skins of the young cattle and characterized by distinct grain or fiber structure.

COWHIDE LEATHER
Term specifically applied to leather made from hides of cows, although it is generally loosely used to designate any leather tanned from hides of animals of the bovine species.

EMBOSSED LEATHERS
Hides or skins finished with designs stamped on by etched, engraved, or electrotyped plates or rollers. A mechanical process of permanently imprinting a great variety of unique effects to the leathers surface. Done under considerable heat and pressure. Embossed designs may be an imitation of the natural grain or different animal skins, or designs of an artificial nature.

FULL GRAIN
Outer cut taken from the hair side of the hide from which nothing except the hair and the associate epidermis have been removed.

GLAZED FINISHED
A leather with polished surface produced by heavy pressure of a roller of agate, glass, metal or other suitable material on a selected finish formulation.

GRAIN
The outer or hair side of the hide or skin. Also the pattern of the outer surface after the hair or wool and epidermal tissue have been removed.

GRAINED LEATHER
Any leather on which the original grain has been highlighted by a finishing process.

IMITATION LEATHER
Materials so made and finished as to resemble leather. Included are coated fabrics, rubber and rubber compositions, and plastic materials. Terms connoting genuine leather should be used in trade names, as for the example "plastic calf," "plastic leather," "Compo-leather," "leatherlike" or "leatherette."

LAMBSKIN LEATHER
Describes leather made from either lamb or sheepskin, in as much as the skin is identical in appearance after tanning.

MINERAL TANNED
Leathers which have been tanned by mineral substances, notably the salts of chromium, aluminum, and zirconium.

MOROCCO LEATHER
Vegetable tanned fancy goatskins having a distinctive grain produced by boarding or graining. Embossed imitation of natural goat grain on other kinds of leather sometimes is called Morocco grained.

NAPPA LEATHER
Chrome, alum or combination tanned grain sheep or lambskin glove leather, drum colored.

OIL TANNED
Leathers tanned with certain fish oils. Produces a very soft, pliable leather such a chamois.

PATENT LEATHER
Leather with a finish which is mirror-like, flexible and waterproof. Also leather of this appearance made by film lamination.

PEBBLE GRAIN
An embossed-leather grain finish resembling a pebble surface, ranging from fine pebbled Morocco goat to heavy scotch grain upper leather.

REVERSED CALF
Terms applied to calf leather of heavier weights, finished on flesh side, containing oils to make it more water-resistant than suede, used for shoes where a nappy leather is required. Originally called "Trench Calf" in England, the term "Hunting Calf" is also used in that country. The term "Service Leathers" is used but is generally applied to splits and side leather.

SADDLE LEATHER
As used in the manufacture of harness and saddlery, this is a vegetable tanned cattlehide. The leather is usually a tan shade, is produced in various thicknesses and is also used outside the saddlery trade for leather goods of various types. In connection with other tannages, the term should be used to specify the leather as "saddle color," "saddle shade," or "saddle finish." "California Saddle Leather" is a registered trade name restricted to leather tanned by a tanner located in the State of California.

SHARKSKIN

Genuine sharkskin leather is made from the top grain of the hides of certain species of sharks and is used principally in shoes, belts, wristwatch straps, luggage, fine leather goods and for industrial purposes. It has varying, natural grain markings, or fine, smooth mesh like grain similar to pin seal. The term "sharkskin leather" should not be applied to other leathers, such as horse butts, embossed with shark grain.

SPLIT
A term used to describe the under portion of a hide or skin, split into two or more thicknesses. Devoid of a natural grain, it may be either sueded or pigment finished and embossed. Under ruling of the Federal Trade Commission, a split must be so marked and cannot be called "genuine leather" or "genuine cowhide."

TOP GRAIN
The grain split of a hide from which nothing has been removed except the hair and associated epidermis.

TRAVELING BAG, SUITCASE & STRAP LEATHER
A general term for leather used in traveling bags and suitcases. It does not include the light leather employed for women's handbags. The staple material for bag and case leather at present is leather made from the hides of animals of the bovine species, but other skins, including heavy sealskins and goatskins, are also used for this purpose.

WATER REPELLENT LEATHER
A leather which has been treated with any of several chemical compounds which repel the absorption of external water.

WAX FINISH
A method of finishing heavier weights of upper leather on the flesh side by working wax into the substance.

For more information on leather terminology, contact the Leather Industries of America, 1000 Thomas Jefferson St., N. W., Suite 515, Washington, DC 20007. Phone (202) 342-8086, fax (202) 342-9063.